

## REMARKS

Claims 1-16 are pending in the present application. By virtue of this response, claims 1, 13, 14, and 15 have been amended without prejudice or disclaimer of any previously claimed subject matter and claim 12 has been cancelled. Support for the amendments may be found in the claims as originally filed and throughout the present application. Accordingly, claims 1-11 and 13-16 are currently under consideration. Amendment of certain claims is not to be construed as a dedication to the public of any of the subject matter of the claims as previously presented.

### Rejections under 35 U.S.C. §102 and §103

A. Claims 1-4, 6-11, and 16 stand rejected under 35 U.S.C. § 102 (e) as being anticipated by Fujimoto et al. (U.S. Patent No. 6,242,761).

Claim 1 has been amended to include the features of claim 12. Claim 12 stands rejection under 35 U.S.C. § 103 (a) as being unpatentable over Fujimoto et al. (U.S. Patent No. 6,242,761) in view of Takeuchi et al. (U.S. Patent No. 6,130,446). Accordingly, Applicants traverse the rejection to claim 12 in support of the patentability of amended claim 1 and dependent claims 2-4, 6-11, and 16.

In regard to claim 1, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness because there is no identified suggestion, motivation, or teaching for the combination of Fujimoto and Takeuchi to meet the features of claim 1. Further, Applicants submit that the combination of Fujimoto and Takeuchi fail to disclose or suggest the features of claim 1.

To establish a *prima facie* case of obviousness there must be some suggestion or motivation in the prior art to combine the reference teachings. MPEP §§ 2142, 2143.01. The Examiner's motivation to combine the teachings of Fujimoto and Takeuchi is lacking. The Examiner contends that the combination is obvious because it is not inventive to discover an

optimal working range. The Examiner has failed, however, to indicate any teaching, suggestion, or motivation for the combination of Fujimoto and Takeuchi to meet the features of claim 1 in the first instance, and has merely found that once combined the optimal working range is obvious. Therefore, the Examiner has not presented any evidence or line of reasoning that provides a teaching, suggestion, or motivation for combining the two references and the rejection should be withdrawn.

Further, Applicants submit there is no teaching, suggestion, or motivation to combine the references or to modify Fujimoto, the electrode thickness of Fujimoto being described as 550 nm or more, to produce a gallium nitride compound semiconductor light-emitting diode wherein "the n-type transmissive electrode and the p-type transmissive electrode are of a thickness of 30 nm or less." The "transmissive electrode," as defined in the present specification on page 5, lines 16-23, as an electrode that is substantially transparent with respect to light, may provide an n-type transmissive electrode and a p-type transmissive electrode having the advantage, e.g., that improved external emission efficiency can be achieved (page 36, lines 9-11). In contrast, Fujimoto does not describe the problem of external emission efficiency, and Takeuchi discloses a method to improve the bonding of the n-type electrode without requiring high temperature heat treatment. (Takeuchi, col. 2, lines 5-10). Neither reference discloses any teaching, suggestion, or motivation for modifying the electrode of Fujimoto to include a transmissive n-type electrode of 30 nm or less. Therefore, one of ordinary skill in the art would have no reason to modify the thick electrode of Fujimoto (550 nm or more) to include the n-type electrode of Takeuchi, let alone a transmissive n-type electrode as presently claimed. Accordingly, Applicants submit the Examiner has used impermissible hindsight in making the combination and the rejection should therefore be withdrawn.

The Examiner states in paragraph 9 of the present Office Action (paper no. 17) that Fujimoto does not expressly disclose a GaN compound LED wherein the "n-type and p-type

transmissive electrodes are of a thickness of 30 nm or less.” The Examiner contends, however, that Takeuchi discloses that “Ni and Au are used as a transparent metal film electrode having different thickness, see Table 1, and the transparency can be adjusted by decreasing the thickness, column 1 lines 39-45.”

Initially, it is noted that only the first row of Takeuchi relates to thickness, all other values in the table are resistances. (Col. 3, lines 46-49). The same is true of Table 3. Furthermore, the different thicknesses listed relate to different electrode compositions. The aim of Takeuchi is not to provide a transparent or transmissive n-type electrode, but to improve the bonding of the n-type electrode with lower heat treatment. (Col. 2, lines 5-10 and 25-29). Therefore, one of ordinary skill in the art would not be motivated to combine or modify the references to meet the features of the present claims, e.g., including a transmissive n-type electrode.

The Examiner also refers to column 1, lines 39-45 of Takeuchi as disclosing transparent metal film electrodes having different thicknesses. This portion of Takeuchi, however, relates to a transparent (transmissive) p-type electrode and not a transmissive n-type electrode. Takeuchi discloses bonding of n-type electrodes, but at no point does Takeuchi disclose or suggest that a transmissive n-type electrode is possible or desirable. References to transmissive electrodes in Takeuchi relate specifically to p-type electrodes and not n-type electrodes, e.g., several references to “the n-type electrode 5 and the transparent electrode 4.” (Col. 8, lines 9-33). Additionally, it is clear from Figure 1 of Takeuchi that the n-type electrode (element 5) is not intended to be a transmissive element because the pad electrode (element 8) is shown completely covering the n-type electrode, where the pad electrode consists of 500 nm of Au and is therefore not transmissive. (Col. 8, lines 21-25). Therefore, one skilled in the art would not be motivated to combine or modify Fujimoto and Takeuchi to meet the features of claim 1 because neither reference discloses or suggests a transparent n-type electrode.

Further, the Examiner maintains that the n-type transmissive electrode of Fujimoto et al. is substantially transparent “because of the inherent material properties and structure disclosed. In re Best, 195 USPQ 430, 433 (CCPA 1997).” (Emphasis added). Claim 1 recites that the n-type transmissive electrode and p-type transmissive electrode are “thin films so as to be substantially transparent,” and “are of a thickness of 30 nm or less.” Therefore, the combination of structure and material recited in amended claim 1 leads to the “substantially transparent” nature of the n-type electrode of claim 1, which is neither disclosed nor suggested by Fujimoto.

The n-type electrodes of Fujimoto are not “thin films so as to be substantially transparent,” as recited in amended claim 1. In contrast, the n-type electrode 130 of Fujimoto is formed of a stacked structure of 50 nm-thick Ti and 0.5  $\mu$ m-thick Au. (Fujimoto, col. 6, line 66 to col. 7, line 3). Therefore, the electrode of Fujimoto is at least 550 nm thick, which is clearly not a thin film that is substantially transparent to light and the electrode thickness is clearly greater than 30 nm. The n-type electrode of Fujimoto comprises a stacked structure of metal layers, and while the n-type electrode of Fujimoto may include similar materials as the n-type electrode of claim 1, the structure is completely different. The Examiner has not identified a teaching, suggestion, or motivation in Fujimoto or Takeuchi for modifying the structure of Fujimoto to meet the features of claim 1. Accordingly, the rejection should be withdrawn.

Claims 2-4, 6-11, and 16 depend from claim 1 and should be allowable for at least similar reasons stated above.

Further, in regard to claims 7 and 8, Applicants further submit that the combination of Fujimoto and Takeuchi do not disclose a device wherein the “n-type pad electrode and the p-type pad electrode are provided substantially along one side of a light emitting face,” as recited by claim 7, or a device where a “p-type pad electrode is formed in the vicinity of a center of a light emitting face,” as recited by claim 8.

The Examiner contends that the features of claims 7 and 8 are taught by Figure 1 of Fujimoto. Figure 1 of Fujimoto, however, is a cross-sectional view (Fujimoto, col. 3, lines 65-67), and does not illustrate the details described by either claim 7 or 8 (compare with the schematic plan views shown in Figures 2 and 3 of the present application, for example). Certainly Figure 1 of Fujimoto cannot be used to teach both a p-type electrode at the center of a face and a p-type electrode substantially along one side of a face. Accordingly, the rejection should be withdrawn.

Independent claims 13, 14, and 15 have been amended to include similar features as previous claim 12 and should be allowable over Fujimoto and Takeuchi for at least similar reasons discussed above.

B. Claim 13 stands rejected under 35 U.S.C. § 102 (b) as being anticipated by Edmond et al. (U.S. Patent No. 5,739,554).

Claim 13 has been amended to include the features of claim 12. Applicants submit that Edmond does not disclose or suggest the features of claim 12, nor is it alleged to, and the rejection should be withdrawn.

C. Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto in view of Tamaki et al. (U.S. Patent No. 5,369,289).

Applicants submit that the combination of Fujimoto and Tamaki do not disclose or suggest a device wherein "the n-type transmissive electrode is formed on a side face of the substrate, a side face of the buffer layer, and a side face of the n-type gallium nitride compound semiconductor layer in a region neighboring the buffer layer," as recited by claim 5.

The Examiner states that Tamaki discloses an "n-type transmissive electrode 8 [] formed on a side of the substrate 1." (paragraph 8 of the present Office Action). Applicants respectfully

disagree. Tamaki discloses that "an Al layer which is the lower-most layer of the second electrode 8 may be provided as a reflection layer." (Col. 7, lines 9-12; emphasis added). Thus, the n-type electrode 8 of Tamaki is reflective and not transmissive. Further, there is no disclosure or suggestion that the n-type electrode 8 of Tamaki is substantially transparent with respect to light, i.e., it is not "transmissive," as recited in the present claims.

For at least the above described reason the features of claim 5 are not disclosed nor suggested by Tamaki and Fujimoto, either separately or in combination. Furthermore, the deficiencies of these references are not made up for by any of the references cited by the Examiner, nor are the alleged to. Accordingly, the rejection should be withdrawn.

D. Claim 12 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over Fujimoto in view of Takeuchi.

Claim 12 has been cancelled and the features of claim 12 have been included in claims 1, 13, 14, and 15. Accordingly, the rejection has been addressed above.

E. Claim 14 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over Edmond et al. (U.S. Patent No. 5,739,554) in view of Ishikawa et al. (U.S. Patent No. 5,977,565).

Claim 14 has been amended to include the features of claim 12. Applicants submit that combination of Edmond and Ishikawa do not disclose or suggest the features of claim 12, nor are they alleged to, and the rejection should be withdrawn.

F. Claim 15 stands rejected under 35 U.S.C. § 103 (a) as being unpatentable over Fujimoto in view of Ishikawa.

Claim 15 has been amended to include the features of claim 12. Applicants submit that combination of Fujimoto and Ishikawa do not disclose or suggest the features of claim 12, nor are they alleged to, and the rejection should be withdrawn.

## CONCLUSION

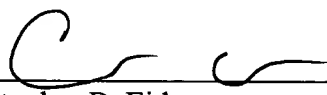
Applicants have, by way of the amendments and remarks presented herein, made a sincere effort to overcome rejections and address all issues that were raised in the outstanding Office Action. Accordingly, reconsideration and allowance of the pending claims are respectfully requested. If it is determined that a telephone conversation would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952**, referencing docket no. 299002051900. However, the Assistant Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

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